Official Newsletter of the Vascular Dynamics Lab

Issue 4, Winter 2020

Email: vdl@mcmaster.ca
Welcome:

Thanks for opening this newsletter. I know that you are continually bombarded with information in both your personal and professional lives. I also know that your time is precious and that in choosing to read about what has been going on the VDL here at McMaster, you have made an investment in us. This newsletter serves many purposes and we are hopeful you find the read interesting and informative. Preparing the newsletter is a group effort and it is a way for us to stay connected to our many research partners, allow our trainees to practice their communication skills, assist us in building and supporting our community and serve as a valuable record for the lab.

I was thinking the other day that one really unique thing about academic research labs is the transient nature of pretty much everyone involved, except the principle investigator! In most organizations one of the main goals is to recruit and retain the best people. In an academic research lab, while we still try to recruit the best, a fundamental purpose is to train our personnel for opportunities when they leave us. While the continual renewal of personnel can lead to challenges of continuity, it also generates vibrancy and innovation. Even though each trainee is only with us on a temporary basis, they leave their mark on the lab. I often think about these legacies but don’t always tell new trainees where they come from.

In this edition we are highlighting the career of a former trainee, Dr. Cheri McGowan, who is now a faculty member at the University of Windsor. Cheri was one of the first graduate students I had the pleasure to interact with and she helped to establish the clinical cardiovascular research focus in the lab. What you might not know, is that Cheri also left behind a strong legacy of thinking about how to best prepare our participants for their experiences in the lab. During her projects, Cheri prepared endless laminated participant instructions and logbooks and spent many hours carefully explaining her protocol to her research participants. Many of the processes she initiated are still used today!

Thanks again for engaging with us and please reach out with any feedback or suggestions for future editions of the newsletter.

Dr. Maureen MacDonald
Principal Investigator
Current Lab Members

Staff

Todd Prior  
Lab Manager

Dr. Emily Dunford  
Postdoctoral Fellow

Dam Nguyen  
Computer Specialist

Graduate Students

Nicole Proudfoot  
PhD Candidate

Jem Cheng  
PhD Candidate

Jennifer Williams  
PhD Candidate

Sydney Valentino  
PhD Student
Current Lab Members

Graduate Students (cont’d)

Connor Droog
MSc Student

Undergraduate Students

Joshua Cherubini
Thesis Student

Zaryan Masood
Thesis Student

Meg Rathod
Thesis Student

Christina Pizzola
Placement Student

Joshua Turner
Placement Student

Dani Joshi
Placement Student
(Fall 2019)
Current Lab Members

Undergraduate Students

Andrea Borgea
Volunteer

Rachael Morrison
Volunteer

Lab members at the annual Holiday Party 2019. Top row: Emily Dunford, Maureen MacDonald, Nicole Proudfoot, Sydney Valentio, Jennifer Williams (from left to right); Bottom row: Connor Droog, Megh Rathod, Joshua Cherubini (from left to right). Missing: Dani Joshi, Zaryan Masood
## Thesis Defenses

Multiple Vascular Dynamics Laboratory Students were successful in defending their respective master’s thesis this past summer. Congratulations to Vanessa, Joey, And Sydney!

| **Vanessa Rizzuto**, July 26, 2019 | “Determining the repeatability of low-flow mediated constriction and total vessel reactivity in brachial artery of humans.” |
| **Joey Bacauanu**, August 21, 2019 | “The relationship between objectively measured habitual physical activity during the preschool years and peripheral artery endothelial function in school-aged children.” |
| **Sydney Valentino**, August 26, 2019 | “Cardiac function responses to stair climbing-based high intensity interval training in individuals with coronary artery disease.” |

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**Photo 1. Vanessa Rizzuto and Dr. MacDonald at Vanessa’s defense.**

**Photo 2. Joey Bacauanu and Dr. MacDonald at Joey’s defense.**

**Photo 3. Sydney Valentino and Dr. MacDonald at Sydney’s defense.**

**Sydney Valentino celebrating her successful defense with the ceremonial chalice at the Phoenix.**

**Joey Bacauanu preparing for her thesis defense presentation.**
Beaches, Forests, Wineries and Collaborations in Australia

By: Maureen MacDonald

Sept 18–25, I (Maureen MacDonald) travelled to Perth Australia to join Jem Cheng for a one week visit to the University of Western Australia. Our host, Professor Danny Green, organized and delivered on an action-packed week. The primary purpose of my visit was to serve as an external examiner, along with Dr. Jaume Padilla (University of Missouri), for the PhD exam for Michael Wheeler. During the week, we toured the extensive facilities at the University of Western Australia, attend a research symposium featuring a synopsis of all of the current research projects being led by Prof. Green and Dr. Louise Naylor and present lectures in the Departmental seminar series.

Prof. Green also delivered on an outstanding tour of Margaret River and surrounding area. The highlights of the tour included, a run through Leeuwin National Park, meeting the owner of Gabriel Chocolates, trying to keep up with Danny “Billy goat” Green at Canal Rocks, lunches at the Beer Farm and Vasse Felix Winery, a drive through the old growth forest and seeing the view from the Cape Leeuwin Lighthouse, all while listening to Danny singing along to Johnny Cash in the car.

Michael Wheeler did an outstanding job on his thesis defense, capping off a great visit to this beautiful location. As with all opportunities provided by my academic career, the most enriching aspect of this trip was the chance to build and foster relationships with great people. Thanks again to Danny Green, Jaume Padilla, Michael Wheeler, Howard Carter, Carrie Atkinson, Louise Naylor, David Dunstan and everyone else who made the visit so spectacular.
Events

VDL Annual Gingerbread House Decorating Party December 6, 2019

In the spirit of the holidays, the VDL construct a gingerbread house as a group every year. A fun way to come together as a team during the holiday season!

Thank you to Dr. MacDonald for providing the materials!

Lab members at the annual Holiday Party 2019. Top row: Dr. Maureen MacDonald, Connor Droog, Dani Joshi, Nicole Proudfoot, Todd Prior, Sydney Valentino, Zayan Massod (from left to right); Bottom row: Dr. Baraa Al-Khazraj, Joshua Cherubini, Megh Rathod, Jennifer Williams, Dr. Emily Dunford
Research Trip: Boulder & Denver, Colorado
December 8th – 13th 2019
By: Jennifer Williams

From December 8th – 13th, 2019, I went to the beautiful University of Colorado – Boulder campus to meet with Dr. Douglas Seals and his research team in the Integrative Physiology of Aging Laboratory. The lab primarily focuses on cardiovascular aging, including the cellular mechanisms that mediate changes in artery structure and function, alongside interventions to reduce the impacts of aging. More recently, the lab has become interested in the intersection of vascular aging and cognitive and motor impairment. The main purpose of the trip was to learn the endothelial cell collection technique, which Dr. Seals’ lab group has implemented in numerous human research trials over the past decade. In addition, I shadowed numerous cell, animal, and human trials, gaining great appreciation for the translational research the lab conducts.

Also, while in Colorado, I had the opportunity to meet with Dr. Kerrie Moreau at the University of Colorado – Anschutz Medical Campus. Her research primarily focuses on hormonal regulation on vascular function in human trials, including women taking hormonal replacement therapy, and men with low testosterone levels. This research trip was foundational for pursuing research in Colorado with Drs. Seals and Moreau in Fall 2020, through the NSERC Michael Smith Foreign Study Supplement. Between the shadowing of trials and meeting with members of the research team, I also had the opportunity to briefly explore Boulder, CO – including its local hiking trails (see photo).
Students as Partners Project: Integrating Female Participants into Research
By: Rachel Morkunas

With the recent focus on sex- and gender-based analysis in physiology research studies, we decided to qualitatively explore researchers’ experiences and perceived challenges of integrating female participants into research. We’ve had the opportunity to conduct individual interviews with graduate students and Faculty members in the Department of Kinesiology and have gained a lot of insight on the perceptions and needs of various labs in regard to considering women’s hormonal cycles in their research. We are currently in the process of data analysis and our next steps involve developing a tool that will hopefully increase accessibility of including women participants in human research studies.

This project has been supported by a Students as Partners program grant in Summer 2019 and Fall/Winter 2019-2020 through the Paul R. MacPherson Institute for Leadership, Innovation, and Excellence in Teaching at McMaster University.

An Introduction to our Undergraduate Students

My name is Joshua Cherubini and I am completing an undergraduate thesis in the VDL through the Kinesiology 4RR6 course. The project I am working on involves investigating the impact of an acute bout of sleep deprivation on endothelial function, and the role of fitness in this relationship. We (Jem, Jennifer, Dr. MacDonald, and myself) have submitted the first draft of our ethics application, and are currently awaiting a response from the ethics board. By: Joshua Cherubini

My name is Zaryan Masood and I am a Life Science 4B09 thesis student in the Vascular Dynamics Lab. I am part of the Hormonal Contraceptives and Early Risk Indicators (HER) study, but more specifically my project focuses on examining the effects of hormonal contraceptives on substrate oxidation. We hope to start participant recruitment and data analysis in January 2020! By: Zaryan Masood

My name is Megh Rathod, an ISCI 4A12 thesis student in the VDL. My project investigates arterial stiffness (though pulse wave velocity and distensibility) in healthy older women after short-term immobilization. I am currently in the data collection and analysis phase! By: Megh Rathod
A 3RP3 Experience in the VDL

Dani joined us as a 3RP3 student in the fall semester of 2019. Throughout her time with us, she attended lab meetings, practiced and refined important vascular dynamics research techniques, data collection and analysis sessions, and journal club meetings. In her final reflection paper for her 3RP3 class, Dani noted that she had become so proficient with tonometry that she was able to participate in data collection with a participant, an opportunity she was not expecting, but for which she was very grateful. Her interest in the world of vascular dynamics led her down the path of endothelial health, and she completed a 3-minute thesis slide regarding the effects of prolonged sitting on endothelial function in the popliteal artery (see below). We are very excited to have Dani sticking around the lab as volunteer in the Winter 2020 semester!

Prolonged leg bending impairs endothelial function in the popliteal artery

**Background**

- Artery wall
- Endothelial cells
- Artery diameter

**Methods**

Flow-mediated dilation (FMD)

- Ultrasound probe
- Popliteal artery
- Cuff

**Results**

\[ \text{Walsh, Restaino, Martinez-Lemus, & Padilla, 2017} \]
Jem’s Trip to Australia Fall 2019

In the fall of 2019, I had the opportunity to travel to sunny Perth, Australia to conduct an ongoing study in collaboration with Dr. Danny Green at the University of Western Australia. This study explores the effects of cycling exercise in different water temperatures on cardiovascular and cerebrovascular function using a custom-built water tank fitted with a bike. Cerebrovascular blood flow and respiration were assessed throughout each session with transcranial doppler probes and a metabolic cart, and endothelial function (FMD) was assessed before and after each session using ultrasound imaging. It was such a treat to run this study poolside and certainly a unique experience for me.

Now science is great and all and I could talk at length about how grateful I am to have had this experience with this world-class lab, but I think some of the greatest lessons I learned were out of the lab. The CVRG (Cardiovascular Research Group) showed me how to kick back and relax the Australian way, and this involves a lot of beaching, wildlife spotting, wining and dining in Margs, and regular trips to Danny’s favourite spot: Little Creatures. They taught me about Aussie language (arvo? thongs?) and lamingtons, and so much more. Most of all, they taught me that there will always be time for both life and really great science. …In return, I taught their postdoc Howard Carter how to wear shoes, which I have been told is a miracle, so I think that is a fair trade for the amazing experience they’ve given me. All jokes aside, I am truly so grateful for my “research exchange” at UWA and feel lucky to have met such great people along the way.
Jem’s Top 5 Tips for Going on a Research Exchange:

1. **Be flexible.** As most research goes, things will likely not go according to plan. It’s okay. There is always room to pivot! Don’t let it tarnish your experience.

2. **Be present.** I have found that I often learn the most in the moments that aren’t planned. Don’t wait for a scheduled lecture or practice session. Be around and be a part of the culture that fosters curiosity and discovery.

3. **Find balance.** You should aim for your research exchange should be productive, but you should also carve out some time for yourself. Saturdays at the beach will do…

4. **Get out of the lab and don’t be afraid to travel solo.** Some of the greatest moments of my Australian adventure have been in pursuit of all the nooks and crannies in beautiful WA.

5. **Enjoy the moment!** This is a once in a lifetime experience. Remember how special a career research is to allow you to have a moment like this and immerse yourself in everything it has to offer.
Stroke Rehabilitation Research Team: MacStroke Canada
By: Kevin Moncion, Elise Wiley, Kenny Noguchi and Dr. Ada Tang

Research Projects

Our CIHR-funded exercise trial “Intensity Matters: An Opportunity to Promote Neurorecovery and Cardiovascular Health in Stroke”, led by Dr. Ada Tang and co-PI Dr. Marc Roig from the Memory Lab at McGill University, is now in full swing. PT PhD student Kevin Moncion, and MSc students Kenny Noguchi and Elise Wiley have been busy visiting stroke recovery groups throughout the Greater Hamilton Area, including Hamilton-Wentworth Stroke Survivors Recovery Association, Hamilton Young Stroke Survivors, and the Halton Stroke Fellowship Stroke Recovery Chapter. To date, two participants have completed the 12-week exercise programs and we are expecting to enroll 8 participants in January 2020.

We are also excited to begin another project, titled “Acute Effects of Aerobic Exercise on Arterial Stiffness in Chronic Stroke”. This project will aim to compare the effect of different exercise intensities on arterial stiffness among individuals with stroke. We are anticipating an additional 3 participants to enrol in this study in January 2020.

Conferences and Presentations

Kevin, Kenny, Elise and Dr. Ada Tang have also been busy disseminating their research findings at numerous conferences over the past few months, including the McMaster Rehabilitation Science Research Rounds, Canadian Stroke Congress in Ottawa, Canadian Society for Exercise Physiology in Kelowna, and at the McMaster Institute for Research on Aging Conferences.

Congratulations to Kenny and Elise for being awarded CIHR Travel Awards to support their travel to present their work at the Canadian Stroke Congress and the Canadian Society for Exercise Physiology Conference.

Elise is also excited to have been selected to attend the Libin International Trainee Symposium: Research is Better with Sex and Gender! The symposium is hosted by the Libin Cardiovascular Institute of Alberta and will take place in Banff in February 2020.

MacStroke Canada would like to thank the Vascular Dynamics Lab for their collaboration and continued support in our research! We are excited to continue moving forward with these studies in the upcoming months!
VDL @ CSEP 2019: “Applying Exercise Science Research to Practice”  
By: Jennifer Williams

From November 6th – 9th, 2019, members of the VDL attended this year’s national CSEP gathering in the beautiful Kelowna, British Columbia. Highlights from this year’s symposia included topics such as: integrative cardiovascular control and exercise, cardiovascular effects of prolonged strenuous exercise, and the influence of sex on physiological and metabolic responses to exercise. We also especially enjoyed this year new symposia and activities, including symposia about teaching in health & exercise sciences, and science communication, and mentorship events throughout the conference.

Another highlight of this year’s CSEP was the McMaster Alumni & Friends night. Hosted at the BNA Brewing Company & Eatery, the event was packed with past and current McMaster graduate students and Faculty members. It was exciting to meet with Alumni and friends from back home and the West coast and reconnect over a point and some yummy food! Thank you to all who attended and made the event a success!

Finally, members of the VDL presented their recent work in oral presentations on a wide variety of topics ranging from basic cardiovascular physiology to applications in clinical populations. The titles of each member’s presentation are listed below next to their name:

<table>
<thead>
<tr>
<th>Jem Cheng, PhD candidate</th>
<th>“Relationships between shear rate and flow-mediated dilation at rest in a broad range of populations”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Valentino, PhD student</td>
<td>“Standard and novel measures of cardiac function in response to 12wk of either stair climbing-based interval training or traditional cardiac rehabilitation exercise in individuals with coronary artery disease.”</td>
</tr>
<tr>
<td>Jennifer Williams, PhD candidate</td>
<td>“Impact of the menstrual cycle on vascular function in premenopausal women: systematic review and meta-analysis.”</td>
</tr>
</tbody>
</table>

We are looking forward to next year’s CSEP 2020 in Fredericton, NB.

The McMaster CSEP 2019 crew.
In November 2019, our research lab attended “CSEP 2019: For the Health of it, Applying Exercise Science Research to Practice”, and as always, this conference was a whirlwind of networking and research. We were in the Delta hotel, located along the Okanagan Lake. We were also able to have our third McMaster Alumni social, at the BNA Brewing Co., joined by many of our colleagues connected to McMaster University in various ways. The conference schedule was curated with stimulating panels of diverse speakers, including some new and timely topics. It was first time I had seen a science communication panel and a strong emphasis on translational research woven into all speakers’ talks to nicely fit the conference theme. We had a great representation from the VDL at both poster and oral presentations throughout the conference. I presented my master’s research findings and attempted the new #BetterPoster format, which elicited great conversations centered around both the research and presentation techniques. My favourite social moment of the conference was connecting with newly minted doctoral degree holders, Dr. Sara Oikawa and Dr. Lauren Skelly, along with Jem, who was able to attend as a break from her exchange in Australia, and many other science friends. One of the most meaningful science moments for me was connecting with Dr. Vicky Tolfrey-Goosey, Loughborough University, and of course, Maureen, for a morning meeting to discuss upcoming projects. Following this, I was very excited to see the panel on spinal cord injury (SCI) research. It was quite influential to listen to the much-anticipated panel, chaired by Dr. Kathleen Martin-Ginis, on the application continuum of SCI research with the theme of “Cells to Society to Sport” and presenters Dr. Chris West, Dr. Jasmin Ma, and Dr. Vicky Tolfrey-Goosey. After all the time spent sitting and furiously writing down ideas, I was eager to get out to the mountains on a hike and over my time in Kelowna I enjoyed the views of the city from the top of Knox Mountain and Spion Kop Mountain. The anticipations of this conference experience were low, as this time of year is considering their “shoulder” or transition season. It was remarkably opposite… the hikes and the networking were spectacular, surpassing all expectations.

PhD Student Sydney Valentino presenting her #BetterPoster format at CSEP 2019.
The banquet night was hosted in the Laural Packhouse, an eclectic building with charming fairy lights. Pictured here (left to right) are Beth Godkin (MSc, CSEP-CEP, now at U Waterloo), Michelle Ogrodnik (PhD student with Dr. Jennifer Heisz), Dr. Sara Okawa, Dr. Lauren Skelly, Paige Chambers (PhD Candidate, U Waterloo) and myself, Sydney Valentino.

PhD Candidate Jem Cheng flew in from Australia to give a great presentation at CSEP 2019.

Kelowna, British Columbia offers some spectacular views. What a privilege to attend CSEP 2019 in such a beautiful place! The VDL is looking forward to Fredericton, NB in 2020.
Recent Publications

Journal Articles


Recent Publications

**Journal Articles**


Additions to the Lab

Dr. Baraa Al-Khazraji

Dr. Al-Khazraji joined us as a new faculty member in July 2019 after she completed her postdoctoral training in the school of Kinesiology at Western University. She is interested in: 1) understanding basic hemodynamic control in peripheral and cerebral arteries at rest and during cardiovascular challenges such as exercise, 2) understanding how peripheral and cerebrovascular vessels behave in individuals either at-risk of or have experienced a vascular-related incident, and what the roles of long-term exercise training are on vascular function in such individuals, and 3) improving upon the utility of current vascular imaging tools by using multi-modality imaging approaches. We are very excited to have Dr. Al-Khazraji at McMaster University!

Connor Droog, MSc Student

My name is Connor Droog, and I am the newest addition to the amazing team of graduate students in the Vascular Dynamics laboratory. I completed my undergraduate studies in Spring 2019, earning an Honours Bachelor degree in Kinesiology from Brock University. I felt very welcomed here right away and knew right away this would be the perfect environment for me to complete my graduate studies. I began in the fall of 2019 with much to learn but help from my peers and mentors made the transition much easier. I have since taken on some Research Assistant responsibilities, which has further progressed my integration as a member of the lab.

My previous research experience has been focused in nutrition, exercise interventions, and special populations. I hope to combine these interests in my upcoming thesis work examining acute hyperglycemia and impaired vascular function in persons with Type 1 Diabetes Mellitus. I look forward to what the future has in store for the VDL and myself.
Introduction

Dr. Cheri L. M. McGowan, a VDL alumni (2001-2006), is an Associate Professor and the Associate Dean of Research & Graduate Studies in the Faculty of Human Kinetics at the University of Windsor (Windsor, ON). She holds adjunct positions in the Division of Cardiology, Department of Internal Medicine at the University of Michigan (Ann Arbor, MI, USA), and the School of Medicine and Department of Emergency Medicine at Wayne State University (Detroit, MI, USA), and is an Adjunct Scientist at the Lawson Health Research Institute (London, ON). She currently resides in Ann Arbor, MI with her husband Blake and daughter Anne.

Scope of Research.

Cheri’s research mission is to improve the well-being of the local, provincial, national and global population by providing simple solutions to reduce cardiovascular disease-related morbidity and mortality. Her current research program provides value in four areas: 1) Determines the contribution of the autonomic nervous system to disease pathophysiology, 2) Examines the effectiveness of traditional exercise-based treatments (e.g., Cardiac Rehabilitation), 3) Generates support for alternative exercise interventions (e.g., Isometric handgrip training (IHT), Ashtanga yoga) to improve blood pressure (BP) regulation in healthy and clinical populations, 4) Investigates methods to best implement effective interventions into clinical practice to promote optimal patient standard of care.
Scope of Research Network.

Cheri’s network of research partners spans most continents of the world, and extends to include scientists, clinicians, exercise specialists, program directors, health economists, biostatisticians, public health experts, and policy makers at the University of Windsor, within Windsor-Essex, and within the national and international (United States, United Kingdom, Brazil, Belgium, Australia, Uganda) healthcare, government and academic communities. These ongoing partnerships have resulted in considerable research funding, published manuscripts, presentations at scientific conferences and seminar series, and the translation of proof-of-concept work into the community. Cheri’s current research initiatives include:

1) **Translating effective hypertension (HTN) treatments such as IHT into standard care.** Using her time with Maureen in the VDL as a foundation, Cheri is a global expert in IHT, as is her former lab mate and current collaborator Dr. Phil Millar. HTN is the leading cause of death and disability worldwide and is considered a global health crisis by the World Health Organization. Despite higher awareness and rates of treatment, HTN is poorly controlled around the world. To help lower the burden of HTN in her community and around the world, Cheri is currently leading the following IHT initiatives:
   - “Getting a GRIP on BP in Primary Care,” which lay a foundation for IHT implementation in Windsor-Essex.
   - “IHT Variety Study” which investigates alternative IHT protocols in collaboration with colleagues from the United Kingdom.
   - “Getting a GRIP on Hypertension in Uganda: Giving Repetitive Isometric Exercise for Blood Pressure Control (the GRIP in Uganda Study)” explores the feasibility and effectiveness of IHT in rural eastern Uganda, a low-income country with disproportionately high rates of HTN, to inform scaling up and widespread IHT implementation.

2) **Optimizing Cardiac Rehabilitation (CR).** Cardiovascular disease (CVD) is the leading cause of death worldwide. CR programs offer huge physical and mental health benefit to cardiac patients. To help more patients access CR and improve long-term adherence to healthy behaviors that are developed in these programs, Cheri is leading a team of CR experts in a formal partnership: the “Great Lakes Cardiac Rehabilitation Consortium (GLCRC)”. Consortium members include southwestern Ontario and southeast Michigan cardiologists, scientists, exercise specialists, clinical exercise physiologists, students and statisticians from the University of Windsor (Department of Kinesiology, Faculty of Human Kinetics, Windsor, ON) and Hôtel-Dieu Grace Healthcare (Windsor, ON), Lawson Health Research Institute (London, ON), Henry Ford Medical Group (Detroit, MI) and the University of Michigan - Michigan Medicine (Ann Arbor, MI), with plans to expand to other centres. The GLCRC is the first of its kind in North America and lays a foundation for long term international collaboration and impact.

Support of Student Trainees.

A strong supporter of her students, Cheri supports, guides and trains highly qualified personnel as they pursue their ambitions. She has supervised 47 undergraduate and 24 graduate students and has trained additional undergraduate high school student volunteers in her laboratory. Most of her trainees have attended medical or graduate school, and of the remainder, many become employed in a related field upon graduation.
CALL FOR VDL ALUMNI UPDATES!

We would love to hear from VDL alumni! Please inform us if you have any news that you would like to share with us so that we can include it in future VDL newsletters to update other readers. We are looking forward to hearing from and learning all the exciting endeavours of VDL alumni.

Please contact vdl@mcmaster.ca with any updates, comments, or inquiries.

Thanks for reading!